

0044005

JAN 17 1994

## ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 602532

Station # 12

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) Environmental Restoration		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.:		6. Cog. Engr.: J.A. Stegen		7. Purchase Order No.: N/A	
8. Originator Remarks: For release.				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: N/A	
11. Receiver Remarks:				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: N/A	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Trans- mittal	Orig- inator Dispo- sition	Receiv- er Dispo- sition
1	WHC-SD-EN-TI-216		0	Vegetation Communities Associated with the 100-Area and 200-Area Facilities on the Hanford Site	4	1/2	1	

16. KEY					
Impact Level (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
1, 2, 3, or 4 (see MRP-5.43)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)		1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged	

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)								(G)	(H)		
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
2.	1	Cog.Eng. J.A. Stegen	<i>J.A. Stegen</i>	1/14/94	H6-02	Central Files (2)				3	
2	1	Cog. Mgr. R.P. Henckel	<i>R.P. Henckel</i>	1-14-94	H4-02						
		QA									
		Safety									
		Env.									
3		EPIC (2)			H6-08						
3		Information Release (2)			H4-17						

18. <i>J.A. Stegen</i> J.A. Stegen Signature of EDT Originator Date: 1/17/94		19. _____ Authorized Representative for Receiving Organization Date: _____		20. <i>R.P. Henckel</i> R.P. Henckel Cognizant/Project Engineer's Manager Date: 1-14-94		21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments	
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# INSTRUCTIONS FOR COMPLETION OF THE ENGINEERING DATA TRANSMITTAL

(USE BLACK INK OR TYPE)

BLOCK	TITLE	
(1)*	EDT	<ul style="list-style-type: none"> <li>• Pre-assigned EDT number.</li> </ul>
(2)	To: (Receiving Organization)	<ul style="list-style-type: none"> <li>• Enter the individual's name, title of the organization, or entity (e.g., Distribution) that the EDT is being transmitted to.</li> </ul>
(3)	From: (Originating Organization)	<ul style="list-style-type: none"> <li>• Enter the title of the organization originating and transmitting the EDT.</li> </ul>
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(5)*	Proj./Prog./Dept./Div.	<ul style="list-style-type: none"> <li>• Enter the Project/Program/Department/Division title or Project/Program acronym or Project Number, Work Order Number or Organization Code.</li> </ul>
(6)*	Cognizant Engineer	<ul style="list-style-type: none"> <li>• Enter the name of the individual identified as being responsible for coordinating disposition of the EDT.</li> </ul>
(7)	Purchase Order No.	<ul style="list-style-type: none"> <li>• Enter related Purchase Order (P.O.) Number, if available.</li> </ul>
(8)*	Originator Remarks	<ul style="list-style-type: none"> <li>• Enter special or additional comments concerning transmittal, or "Key" retrieval words may be entered.</li> </ul>
(9)	Equipment/Component No.	<ul style="list-style-type: none"> <li>• Enter equipment/component number of affected item, if appropriate.</li> </ul>
(10)	System/Bldg./Facility	<ul style="list-style-type: none"> <li>• Enter appropriate system, building or facility number, if appropriate.</li> </ul>
(11)	Receiver Remarks	<ul style="list-style-type: none"> <li>• Enter special or additional comments concerning transmittal.</li> </ul>
(12)	Major Assem. Dwg. No.	<ul style="list-style-type: none"> <li>• Enter applicable drawing number of major assembly, if appropriate.</li> </ul>
(13)	Permit/Permit Application No.	<ul style="list-style-type: none"> <li>• Enter applicable permit or permit application number, if appropriate.</li> </ul>
(14)	Required Response Date	<ul style="list-style-type: none"> <li>• Enter the date a response is required from individuals identified in Block 17 (Signature/Distribution).</li> </ul>
(15)*	Data Transmitted	
	(A)* Item Number	<ul style="list-style-type: none"> <li>• Enter sequential number, beginning with 1, of the information listed on EDT.</li> </ul>
	(B)* Document/Drawing No.	<ul style="list-style-type: none"> <li>• Enter the unique identification number assigned to the document or drawing being transmitted.</li> </ul>
	(C)* Sheet No.	<ul style="list-style-type: none"> <li>• Enter the sheet number of the information being transmitted. If no sheet number, leave blank.</li> </ul>
	(D)* Rev. No.	<ul style="list-style-type: none"> <li>• Enter the revision number of the information being transmitted. If no revision number, leave blank.</li> </ul>
	(E) Title or Description of Data Transmitted	<ul style="list-style-type: none"> <li>• Enter the title of the document or drawing or a brief description of the subject if no title is identified.</li> </ul>
	(F)* Impact Level	<ul style="list-style-type: none"> <li>• Enter the appropriate Impact Level (Block 15). Also, indicate the appropriate approvals for each item listed, i.e., SQ, ESQ, etc. Use NA for non-engineering documents.</li> </ul>
	(G) Reason for Transmittal	<ul style="list-style-type: none"> <li>• Enter the appropriate code to identify the purpose of the data transmittal (see Block 16).</li> </ul>
	(H) Originator Disposition	<ul style="list-style-type: none"> <li>• Enter the appropriate disposition code (see Block 16).</li> </ul>
	(I) Receiver Disposition	<ul style="list-style-type: none"> <li>• Enter the appropriate disposition code (see Block 16).</li> </ul>
(16)	Key	<ul style="list-style-type: none"> <li>• Number codes used in completion of Blocks 15 (G), (H), and (I), and 17 (G), (H) (Signature/Distribution).</li> </ul>
(17)	Signature/Distribution	
	(G) Reason	<ul style="list-style-type: none"> <li>• Enter the code of the reason for transmittal (Block 16).</li> </ul>
	(H) Disposition	<ul style="list-style-type: none"> <li>• Enter the code for the disposition (Block 16).</li> </ul>
	(J) Name	<ul style="list-style-type: none"> <li>• Enter the signature of the individual completing the Disposition 17 (H) and the Transmittal.</li> </ul>
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(19)	Authorized Representative for Receiving Organization	<ul style="list-style-type: none"> <li>• Enter the signature and date of the individual identified by the Receiving Organization as authorized to approve disposition of the EDT and acceptance of the data transmitted, as applicable.</li> </ul>
(20)*	Cognizant Manager	<ul style="list-style-type: none"> <li>• Enter the signature and date of the cognizant manager. (This signature is authorization for release.)</li> </ul>
(21)*	DOE Approval	<ul style="list-style-type: none"> <li>• Enter DOE approval (if required) by letter number and indicate DOE action.</li> </ul>

\* Asterisk denote the required minimum items check by Configuration Documentation prior to release; these are the minimum release requirements.

Date Received: <b>12-9-93NS</b>		<b>INFORMATION RELEASE REQUEST</b>		Reference: WHC-CM-3-4	
Complete for all Types of Release					
Purpose			ID Number (include revision, volume, etc.) WHC-SD-EN-TI-216, Rev. 0		
<input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape			<input type="checkbox"/> Reference <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input type="checkbox"/> Controlled Document <input type="checkbox"/> Other		
			List attachments. N/A		
			Date Release Required 11-5-93 12-10-93		
Title Vegetation Communities Associated with the 100-Area and 200-Area Facilities on the Hanford Site				Unclassified Category UC-630	
				Impact Level 4	
New or novel (patentable) subject matter? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has disclosure been submitted by WHC or other company? <input type="checkbox"/> No <input type="checkbox"/> Yes Disclosure No(s).			Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)		
Copyrights? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has written permission been granted? <input type="checkbox"/> No <input type="checkbox"/> Yes (Attach Permission)			Trademarks? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)		
Complete for Speech or Presentation					
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Title of Journal					
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Review Required per WHC-CM-3-4		Yes No		Reviewer - Signature Indicates Approval	
				Name (printed) Signature Date	
Classification/Unclassified Controlled Nuclear Information		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		B. Williamson } 12/13/93	
Patent - General Counsel		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		B. Williamson }	
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RL Program/Project		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		E. D. Goller } 1-7-94 V6/94	
Publication Services		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		M. Knight } as noted	
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Information conforms to all applicable requirements. The above information is certified to be correct.					
References Available to Intended Audience		Yes No		INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP  Stamp is required before release. Release is contingent upon resolution of mandatory comments.  <div style="font-size: 2em; margin-top: 20px;">J.B.</div> <div style="font-size: 1.5em; margin-top: 10px;">1/12/94</div>	
Transmit to DOE-HQ/Office of Scientific and Technical Information		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Author/Requestor (Printed/Signature)		Date			
J.A. Stegen } J. Commanda					
Intended Audience					
<input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External Responsible Manager (Printed/Signature) Date R.P. Henckel } 12-8-93				Date Cancelled Date Disapproved	

SUPPORTING DOCUMENT		1. Total Pages 61
2. Title Vegetation Communities Associated with the 100-Area and 200-Area Facilities on the Hanford Site	3. Number WHC-SD-EN-TI-216	4. Rev No. 0
5. Key Words vegetation cover, waste sites, dominant species, vegetation community maps	6. Author Name: J.A. Stegen <i>J. Amanda</i> Signature Organization/Charge Code 81310/PE71A	
7. Abstract <i>W. Bickland 1/12/94</i> Stegen, J.A., <i>Vegetation Communities Associated with the 100-Area and 200-Area Facilities on the Hanford Site</i> , WHC-SD-EN-TI-216, Rev. 0, Westinghouse Hanford Company, Richland, Washington.		
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9. Impact Level 4		

## ALPHABETICAL LIST OF PLANT NAMES

Forbs (genus species)	Common Name	Family
<i>Achillea millefolium</i>	yarrow	ASTERACEAE
<i>Amaranthus albus</i>	white pigweed	AMARANTHACEAE
<i>Ambrosia acanthicarpa</i>	bur ragweed	ASTERACEAE
<i>Amsinckia</i> spp.	fiddleneck	BORAGINACEAE
<i>Astragalus</i> spp.	milkvetch	FABACEAE
<i>Balsamorhiza careyana</i>	Carey's balsamroot	ASTERACEAE
<i>Calochortus macrocarpus</i>	sagebrush mariposa lily	LILIACEAE
<i>Capsella bursa-pastoris</i>	shepherd's purse	BRASSICACEAE
<i>Centaurea</i> spp.	knapweed	ASTERACEAE
<i>Chaenactis douglasii</i>	hoary aster	ASTERACEAE
<i>Cirsium vulgare</i>	bull thistle	ASTERACEAE
<i>Comandra umbellatum</i>	bastard toadflax	SANTALACEAE
<i>Conyza canadensis</i>	horseweed	ASTERACEAE
<i>Crepis atrabarba</i>	slender hawksbeard	ASTERACEAE
<i>Cymopterus terebinthinus</i>	turpentine spring parsley	APIACEAE
<i>Descurainia pinnata</i>	western tansymustard	BRASSICACEAE
<i>Draba verna</i>	spring whitlowgrass	BRASSICACEAE
<i>Equisetum</i> spp.	horsetail	EQUISETACEAE
<i>Erigeron filifolius</i>	threadleaf fleabane	ASTERACEAE
<i>Erigeron poliospermus</i>	cushion fleabane	ASTERACEAE
<i>Erigeron pumilus</i>	shaggy fleabane	ASTERACEAE
<i>Erigeron</i> spp.	fleabane	ASTERACEAE
<i>Eriogonum niveum</i>	snow buckwheat	POLYGONACEAE
<i>Eriogonum sphaerocephalum</i>	rock buckwheat	POLYGONACEAE
<i>Erodium cicutarium</i>	storksbill	GERANIACEAE
<i>Grindelia columbiana</i>	Columbia River gumweed	ASTERACEAE
<i>Heterotheca villosa</i>	hairy golden-aster	ASTERACEAE
<i>Holosteum umbellatum</i>	jagged chickweed	CARYOPHYLLACEAE
<i>Lactuca serriola</i>	prickly lettuce	ASTERACEAE
<i>Lepidium perfoliatum</i>	clasping pepperweed	BRASSICACEAE
<i>Lomatium grayi</i>	Gray's desertparsley	APIACEAE
<i>Lupinus pusillus</i>	low lupine	FABACEAE
<i>Machaeranthera canescens</i>	hoary aster	ASTERACEAE
<i>Melilotus alba</i>	white sweetclover	FABACEAE
<i>Microsteris gracilis</i>	pink microsteris	POLEMONIACEAE
<i>Oenothera pallida</i>	pale eveningprimrose	ONAGRACEAE
<i>Orobancha fasciculata</i>	clustered broomrape	OROBANCHACEAE
<i>Penstemon acuminatus</i>	sand beardtongue	SCROPHULARIACEAE
<i>Phlox longifolia</i>	longleaf phlox	POLEMONIACEAE
<i>Plantago patagonica</i>	indian wheat	PLANTAGINACEAE
<i>Rosa woodsii</i>	Wood's rose	ROSACEAE
<i>Salsola kali</i>	Russian thistle	CHENOPODIACEAE
<i>Sisymbrium altissimum</i>	Jim Hill's tumbledustard	BRASSICACEAE
<i>Sphaeralcea munroana</i>	Munro's globemallow	MALVACEAE
<i>Townsendia florifer</i>	showy Townsend-daisy	ASTERACEAE
<i>Tragopogon dubius</i>	yellow salsify	ASTERACEAE
<i>Trifolium repens</i>	white clover	FABACEAE
<i>Verbascum thapsus</i>	common mullein	SCROPHULARIACEAE

## ALPHABETICAL LIST OF PLANT NAMES (cont)

Grasses (genus species)	Common Name	Family
<i>Agropyron dasytachyum</i>	thickspike wheatgrass	POACEAE
<i>Agropyron spicatum</i>	bluebunch wheatgrass	POACEAE
<i>Agropyron sibericum</i>	Siberian wheatgrass	POACEAE
<i>Bromus tectorum</i>	cheatgrass	POACEAE
<i>Elymus spp.</i>	wildrye	POACEAE
<i>Festuca octoflora</i>	slender sixweeks	POACEAE
<i>Oryzopsis hymenoides</i>	indian ricegrass	POACEAE
<i>Poa sandbergii</i>	Sandberg's bluegrass	POACEAE
<i>Sitanion hystrix</i>	bottleneck squirreltail	POACEAE
<i>Sporobolus cryptandrus</i>	sand dropseed	POACEAE
<i>Stipa comata</i>	needle-and-thread grass	POACEAE
Shrubs (genus species)	Common Name	Family
<i>Artemisia tridentata</i>	big sagebrush	ASTERACEAE
<i>Chrysothamnus nauseosus</i>	gray rabbitbrush	ASTERACEAE
<i>Chrysothamnus viscidiflorus</i>	green rabbitbrush	ASTERACEAE
<i>Grayia spinosa</i>	spiny hopsage	CHENOPODIACEAE
<i>Lycium halimifolium</i>	matrimony vine	SOLANACEAE
<i>Purshia tridentata</i>	antelope bitterbrush	ROSACEAE

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## 1.0 INTRODUCTION AND PURPOSE

The Hanford Site, Benton County, Washington, lies within the broad semi-arid shrub-steppe vegetation zone of the Columbia Basin. Thirteen different habitat types on the Hanford Site have been mapped in *Habitat Types on the Hanford Site: Wildlife and Plant Species of Concern* (Downs et al. 1993). In a broad sense, this classification is correct. On a smaller scale, however, finer delineations are possible.

This study was conducted to determine the plant communities and estimate vegetation cover in and directly adjacent to the 100 and 200 Areas, primarily in relation to waste sites, as part of a comprehensive ecological study for the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) characterization of the 100 and 200 Areas. During the summer of 1993, field surveys were conducted and a map of vegetation communities in each area, including dominant species associations, was produced. The field surveys consisted of qualitative community delineations. The community delineations described were made by field reconnaissance and are qualitative in nature. The delineations were made by visually determining the dominant plant species or vegetation types and were based on the species most apparent at the time of inspection. Additionally, 38 transects were run in these plant communities to try to obtain a more accurate representation of the community. Because habitat disturbances from construction/operations activities continue to occur in these areas, users of this information should be cautious in applying these maps without a current ground survey. This work will complement large-scale habitat maps of the Hanford Site.

Information on root depth has also been included. Although the vegetation within most of the exclusion areas around the reactors and on the cribs and burial grounds is sparse to nonexistent, some radiological control zones are vegetated by deep-rooted plants. Plants have the potential to uptake radionuclides and other contaminants, and deep-rooted plants may be an especially significant pathway of contaminant transport throughout the ecosystem. Plants have been designated as deep rooted if the root system of that genus has been shown to exceed 150 cm (Klepper et al. 1985). Although rooting depth is primarily a function of heredity, it can also be a product of the environment in which the plant grows. Specific environmental conditions may cause this depth to vary from plant to plant within a species. Nutrient availability, oxygen supply, soil moisture content, osmotic pressure, soil temperature, pathogens, soil pore size, and soil compaction may cause variations in root depth (Foxy et al. 1984a).

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## 2.0 SAMPLING TECHNIQUE

Preliminary surveys of the 100 and 200 Areas were conducted within and immediately outside the fence line to characterize vegetated versus nonvegetated areas. A qualitative ground survey was conducted in vegetated areas to determine possible vegetation communities and the appropriate placement of transects so that each community could be more accurately characterized. A plant community is an aggregation of plants having a unity of taxonomic composition with relatively uniform distribution and density. The vegetated areas were then surveyed and percent of shrub cover measured.

One-hundred-meter transects were placed in vegetated areas outside radiologically controlled zones. Appendix A provides a summary of transect locations. A 0.2- by 0.5-m modified Daubenmire plot was used to estimate cover. A plot was placed every 5 m along the right side of each 100-m transect. Plant species and their respective percent of cover within each plot were visually measured and recorded. Percent of cover was determined separately for each species overlapping the plot regardless of where individual plants were rooted. Because the canopies of different species are commonly interlaced and those of different stature overlap, the sum of coverage for a stand commonly exceeds 100% (Daubenmire 1968).

Dominant species, the species having the highest average percent of cover within the Daubenmire plots, were determined. Additionally, a survey was conducted to identify plants that were not located in the Daubenmire plots but occurred in the vicinity of the transect. Appendix B provides a list of plants recorded at each site during ground-truthing surveys. Data were not collected in radiation zones, but information from areas with similar vegetation was extrapolated to characterize these waste sites. Vegetation maps were developed from transect data, ground-truthing information, and existing aerial photographs.

The shrub height and percent of cover data have been included to present a better description of the plant community. A 10- by 10-m plot was surveyed at 25-35 m, 50-60 m, and 75-85 m along each 100-m transect to determine shrub height and percent cover. The longest diameter and extreme shoot height from ground level was measured for each shrub. The amount of shrub cover was calculated using estimates of diameter obtained in these plots. In some cases, this may have overestimated the cover, but the majority of the shrubs measured were *Chrysothamnus nauseosus*, which tend to have a spherical shape.

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### 3.0 RESULTS

Using transect data, existing aerial photographs, and ground-truthing information, maps of vegetative cover have been generated for the 100 and 200 Areas. These include disturbed/vegetated and disturbed/nonvegetated areas. Disturbed nonvegetated areas consist mainly of facilities and waste sites. Vegetation in these areas was sparse to nonexistent. If there was more than 10% total cover, areas were classified as disturbed/vegetated areas. The landscaped areas around buildings have not been included in the map because they are not relevant in this study.

It is important to note that this study was conducted over a short time span (June through September). Depending on the length and time of the growing season, the density of plants and community composition will inevitably vary. Many of the species recorded are annuals, and their density may vary considerably from year to year. Changes can be due to weather influences on the setting of seed, conditions necessary for germination, or fungal destruction of seeds and seedlings (Daubenmire 1968). Additionally, widespread use of herbicides for vegetation control, particularly in waste sites, will have a distinct effect on plant density in and around these areas. The information in this document should be used as general information; for more up-to-date information on a particular waste site, surveys should be conducted.

Much of the area in and around the 100 Area reactor sites and 200 Areas was highly disturbed. Generally, disturbed areas were vegetated with stands of the alien annual grass, *Bromus tectorum*. Other plants that dominated disturbed areas near the 100 Area reactor sites and in the 200 Areas were as follows:

- *Centaurea species*
- *Draba verna*
- *Ambrosia acanthicarpa*
- *Salsola kali*
- *Sisymbrium altissimum*
- *Chrysothamnus nauseosus*

When shrubs invaded *B. tectorum* stands, the predominant invader was the native shrub, *C. nauseosus*. *Agropyron sibericum* is a non-native grass that has been used in the 200 Areas to revegetate and stabilize waste burial grounds. It is the most widely used perennial grass for seeding these grounds because it is more drought tolerant and better adapted to sandy soils than other cultivars commonly used in revegetation mixtures. It has been found to spread away from seeded areas at the Hanford Site and to competitively limit cheatgrass where seeded. It is a persistent resident of disturbed Hanford Site landscapes.

The results for shrub cover differ between the 10- by 10-m and the Daubenmire plots. The reasons for the difference in cover may be due to sampling error, variability within each habitat type, or variability in sampling techniques. The main reason for the difference in sample results is a variability in sampling techniques. The Daubenmire technique uses a small

area (total of 2 m<sup>2</sup> per 100 m transect) and plant coverage is visually estimated. The 10- by 10-m plot technique uses a larger area (300 m<sup>2</sup> per 100-m transect) for sampling, and each plant within the area is individually measured for height and width. Therefore, the estimates derived from data collected from the 10- by 10-m plots better represent shrub canopy cover in the plant community.

A comprehensive list of plants that occur in the 100 Areas and possible shoreline plant community delineations is included in *100 Area CERCLA Ecological Investigations* (Lande et al. 1993). A complete list of plants known to occur on the Site can be found in *Vascular Plants of the Hanford Site* (Sackschewsky et al. 1992). General habitat types on the Site are described in *Habitat Types on the Hanford Site: Wildlife and Plant Species of Concern* (Downs et al. 1993).

#### 4.0 100-B/C AREA

The 100-B/C Area lies on a flat bench southwest of 100-K Area. It covers approximately 2.33 km<sup>2</sup> (0.93 mi<sup>2</sup>). The elevation of the area ranges from around 149 m (490 ft) along the southern border to 131 m (430 ft) near the Columbia River. The average slope across the area is about 1%. Erosion has created a steep embankment that drops approximately 9 m (30 ft) to an elevation of 122 m (400 ft) along the Columbia River (Fitzner et al. 1992). Two types of soils have been identified in and around this area: Ephrata Stony Loam and Burbank Loamy Sand (Hajek 1966).

##### 4.1 VEGETATION COMMUNITIES

Vegetation communities in this area are *B. tectorum*/*S. kali*, *C. nauseosus*/*B. tectorum*, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas, minimal (<5%) cover was provided by plants because these areas are routinely sprayed with herbicide as needed as part of a vegetation control program. Percent of cover calculated from Daubenmire plots is listed in Table 4-1, and a map of the general vegetation communities can be seen in Figure 4-1.

##### 4.2 SHRUB COVER

Shrub cover is mainly provided by *C. nauseosus*. In the *C. nauseosus*/*B. tectorum* vegetation community, *C. nauseosus* provides approximately 56% cover and has a mean height of 41 cm. In the *B. tectorum*/*S. kali* vegetation community, *C. nauseosus* provides approximately 3% cover and has a mean height of 56 cm.

Figure 4-1. Vegetation Community Map for 100-B/C Area.

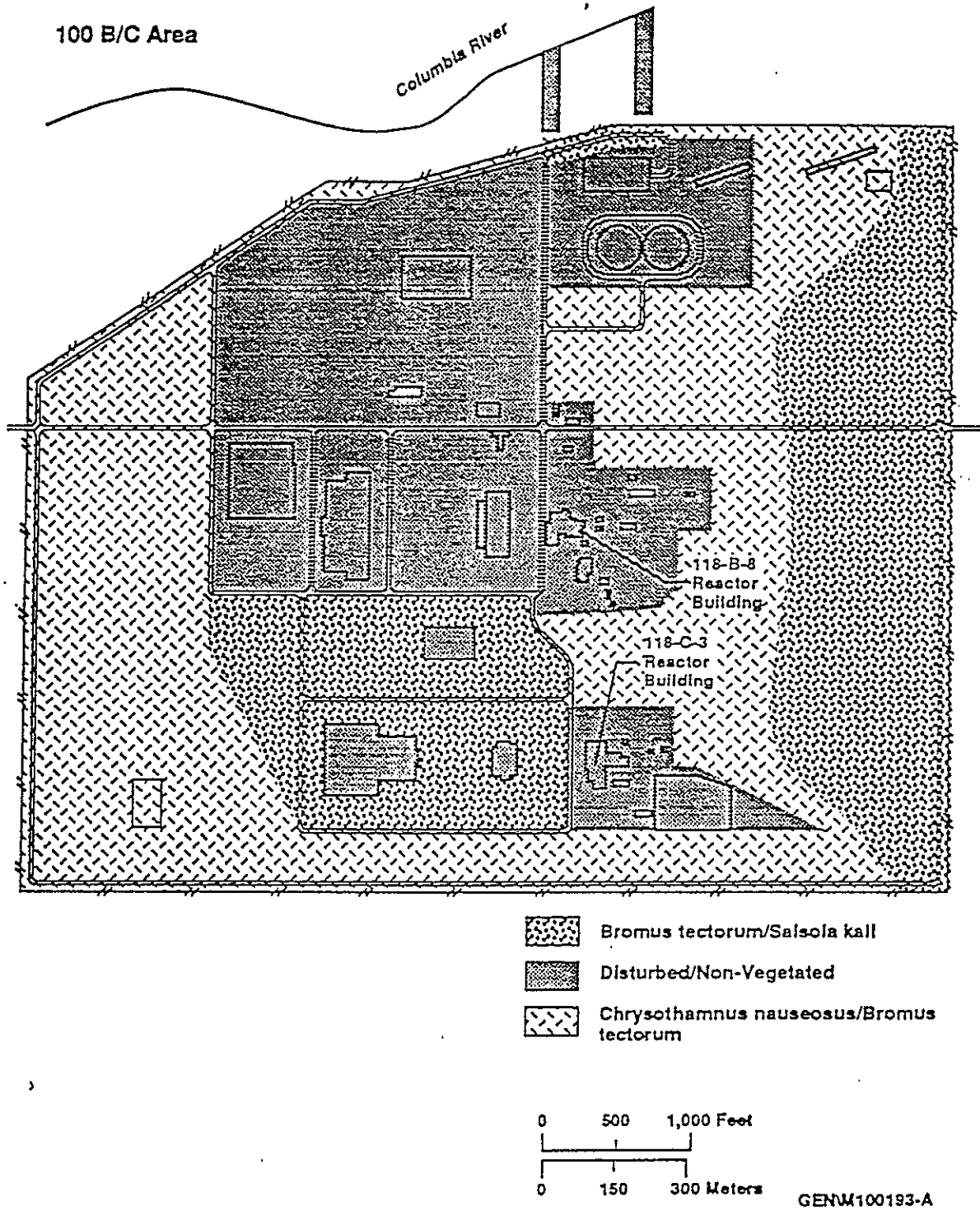




Table 4-1. Vegetation Communities Associated with 100-B/C Area.

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>S. Kali</i>		
<i>B. tectorum</i>	S <sup>1</sup>	15
<i>S. kali</i>	D <sup>2</sup>	11
<i>C. nauseosus</i>	D <sup>2</sup>	3 *
<i>Draba verna</i>	S	2
<i>Holosteum umbellatum</i>	S	1
<i>Poa sandbergii</i>	S <sup>3</sup>	<1
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>B. tectorum</i>		
<i>C. nauseosus</i>	D <sup>2</sup>	56 *
<i>B. tectorum</i>	S <sup>1</sup>	12
<i>D. verna</i>	S	2
<i>P. sandbergii</i>	S <sup>3</sup>	2
<i>Sporobolus cryptandrus</i>	S <sup>3</sup>	<1
<i>H. umbellatum</i>	S	<1

\* - percent of shrub cover was derived from data collected in 10- by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 m transect

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a.

<sup>2</sup>Klepper et al. 1985.

<sup>3</sup>Foxx et al. 1984b.

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## 5.0 100-K AREA

The 100-K Area covers approximately 1.89 km<sup>2</sup> (0.74 mi<sup>2</sup>) and is approximately 152 to 305 m (500 to 1000 ft) from the Columbia River. The ground elevation varies from 122 to 152 m (400 to 500 ft) above mean sea level (amsl), with a land surface slope averaging about 5% toward the northwest boundary (Fitzner et al. 1992). Soil in this area has been described as Ephrata Stony Loam, Ephrata Sandy Loam, and Burbank Loamy Sand (Hajek 1966).

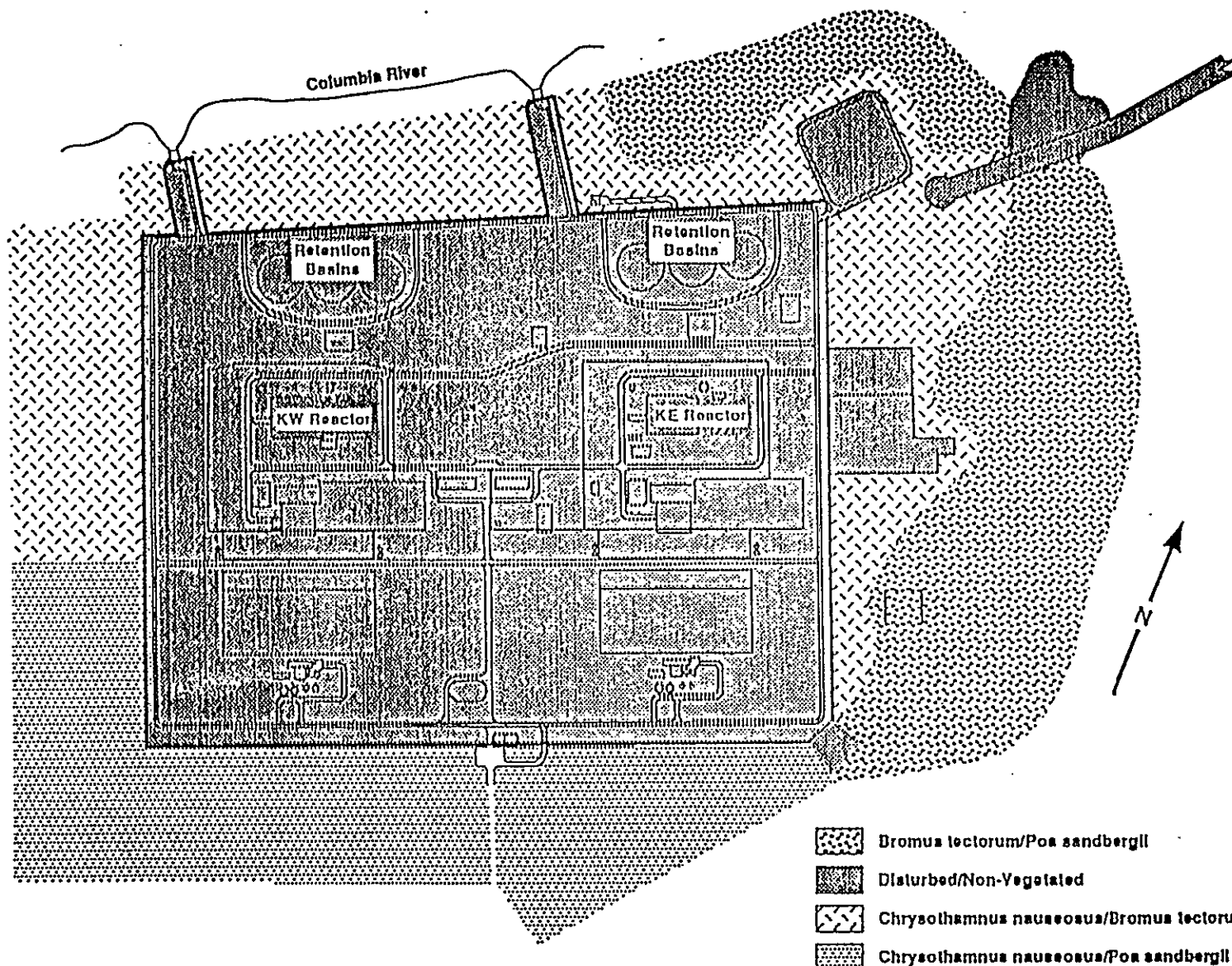
### 5.1 VEGETATION COMMUNITIES

Vegetation Communities in this area are *B. tectorum*/*P. sandbergii*, *C. nauseosus*/*B. tectorum*, *C. nauseosus*/*P. sandbergii*/*B. tectorum*, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas, minimal (<5%) cover was provided by plants because these areas are routinely sprayed with herbicide as needed as part of a vegetation control program. Percent of cover calculated from information collected in Daubenmire plots in the vegetation communities is listed in Table 5-1, and a map of vegetation communities is provided in Figure 5-1.

### 5.2 SHRUB COVER

Shrub cover is mainly provided by *C. nauseosus*. In the *C. nauseosus*/*P. sandbergii*/*B. tectorum* vegetation community, the estimated shrub cover is 9% with a mean height of 35 cm. In the *C. nauseosus*/*B. tectorum* vegetation community, the estimated shrub cover is 12% with a mean height of 76 cm. In the *B. tectorum*/*P. sandbergii* vegetation community, available shrub cover is minimal (approximately 1 shrub per 100 m) and although no shrubs were recorded in the transect, *C. nauseosus* was present in the general area.

Figure 5-1. Vegetation Community for 100-K Area.



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Table 5-1. Vegetation Communities Associated with 100-K Area. (sheet 1 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENTAGE COVER
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>P. sandbergii</i> / <i>B. tectorum</i>		
<i>C. nauseosus</i>	D <sup>2</sup>	9 *
<i>P. sandbergii</i>	S <sup>3</sup>	9
<i>B. tectorum</i>	S <sup>1</sup>	9
<i>H. umbellatum</i>	S	4
<i>D. verna</i>	S	2
<i>Erodium cicutarium</i>	Unknown	1
<i>S. kali</i>	D <sup>2</sup>	<1
<i>Machaeranthera canescens</i>	S <sup>2</sup>	<1
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>P. sandbergii</i>		
<i>B. tectorum</i>	S <sup>1</sup>	58
<i>P. sandbergii</i>	S <sup>3</sup>	5
<i>D. verna</i>	S	4
<i>Sisymbrium altissimum</i>	Unknown	<1
<i>H. umbellatum</i>	S	<1
<i>S. kali</i>	D <sup>2</sup>	<1

Table 5-1. Vegetation Communities Associated with the 100-K Area.  
(sheet 2 of 2)

SPECIES	ROOT DEPTH <sup>A</sup>	PERCENTAGE COVER
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>B. tectorum</i>		
<i>B. tectorum</i>	S <sup>1</sup>	42
<i>C. nauseosus</i>	D <sup>2</sup>	12 *
<i>D. verna</i>	S	6
<i>P. sandbergii</i>	S <sup>3</sup>	3
<i>H. umbellatum</i>	S	1
<i>S. kali</i>	D <sup>2</sup>	<1
<i>S. altissimum</i>	Unknown	<1
<i>Amsinckia spp.</i>	Unknown	<1

\*.- percent of shrub cover was derived from data collected in 10- by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100-m transect

<sup>A</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

## 6.0 100-N AREA

The 100-N Area covers 650 acres, with the 100-D Area on the northeast boundary and the Columbia River on the northwest boundary. Elevation ranges from 119 m (390 ft) amsl at the Columbia River to approximately 135 m (450 ft) amsl on the east side of the area. The area is surrounded by hummocky terrain, which is perhaps the result of catastrophic flooding associated with Pleistocene glaciation (Fitzner et al. 1992). Areas between the hummocks contain large boulders several feet in diameter and Ephrata Sandy Loam underlain with gravel (Hajek 1966).

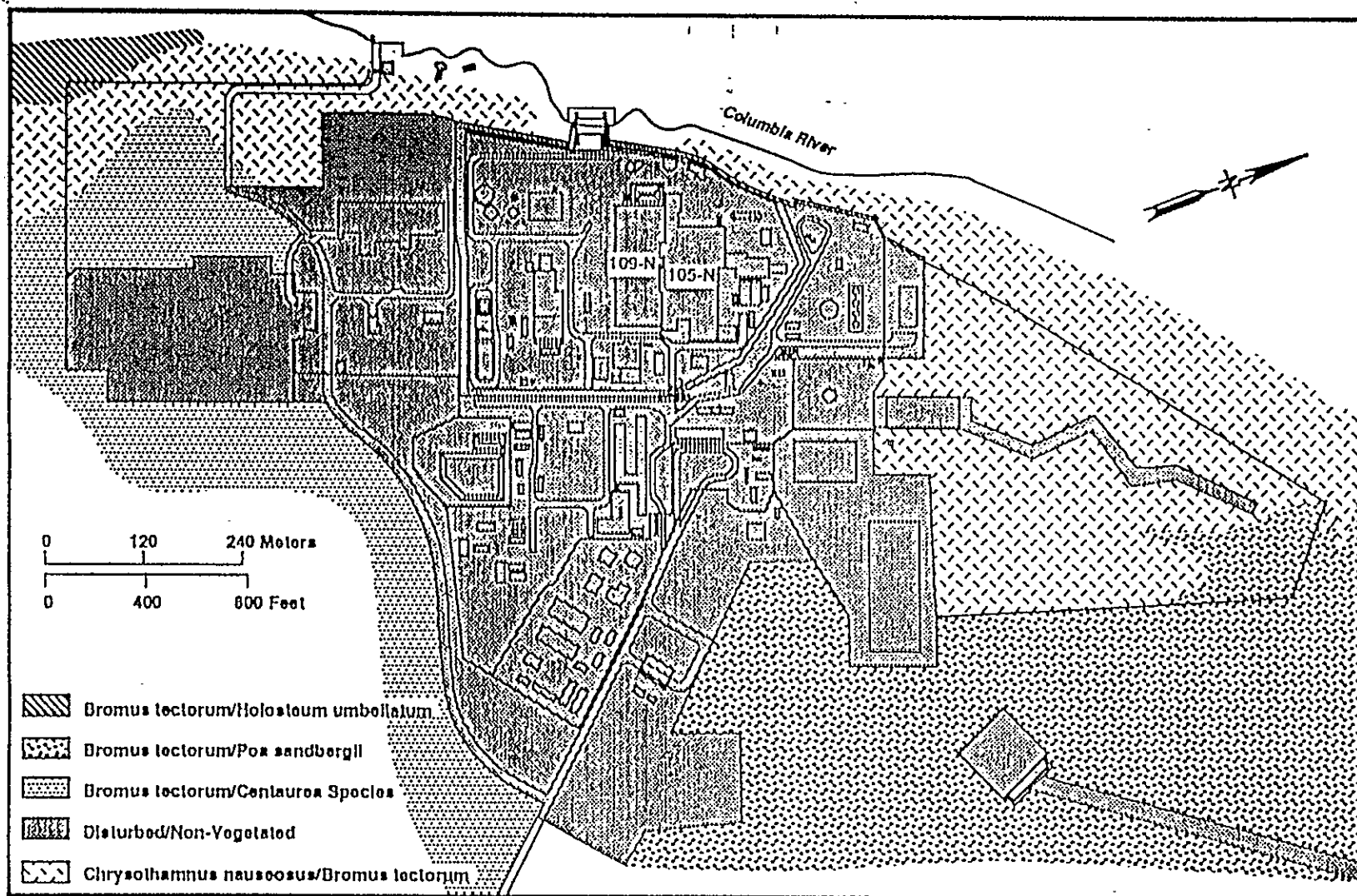
### 6.1 VEGETATION COMMUNITIES

Vegetation communities in this area are *B. tectorum*/*P. sandbergii*, *C. nauseosus*/*B. tectorum*, *B. tectorum*/*Centaurea* species, *B. tectorum*/*H. umbellatum*, and disturbed/nonvegetated areas. In the disturbed/non-vegetated areas, there was minimal (<5%) cover provided by plants because these areas are routinely sprayed with herbicides as needed as part of a vegetation control program. Percent of cover calculated from information from Daubenmire plots for the vegetation communities is listed in Table 6-1 and a map of the general vegetation communities is provided in Figure 6-1.

### 6.2 SHRUB COVER

Shrub cover is mainly provided by *C. nauseosus*. In the *B. tectorum*/*Centaurea* species vegetation community, *C. nauseosus* provides approximately 9% cover and has a mean height of 46 cm. In the *C. nauseosus*/*B. tectorum* vegetation community, the average shrub cover is 18% with a mean height of 46 cm. In the *B. tectorum*/*P. sandbergii* and *B. tectorum*/*H. umbellatum* vegetation communities, available shrub cover is minimal (approximately 1 shrub per 100 m); therefore, no shrubs were recorded in the transect although *C. nauseosus* was present in the general area.

Figure 6-1. Vegetation Community Map for 100-N Area.



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Table 6-1. Vegetation Communities Associated with 100-N Area. (sheet 1 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENTAGE COVER
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>B. tectorum</i>		
<i>B. tectorum</i>	S <sup>1</sup>	26
<i>C. nauseosus</i>	D <sup>2</sup>	18 *
<i>D. verna</i>	S	13
<i>Centaurea spp.</i>	Unknown	3
<i>H. umbellatum</i>	S	1
<i>S. kali</i>	D <sup>2</sup>	<1
<i>P. sandbergii</i>	S <sup>3</sup>	<1
<i>S. altissimum</i>	Unknown	<1
<i>Ambrosia acanthicarpa</i>	D <sup>2</sup>	<1
VEGETATION COMMUNITY- <i>B. tectorum</i> / <i>Centaurea</i> species		
<i>B. tectorum</i>	S <sup>1</sup>	30
<i>Centaurea spp.</i>	Unknown	10
<i>C. nauseosus</i>	D <sup>2</sup>	9 *
<i>H. umbellatum</i>	S	6
<i>D. verna</i>	S	2
<i>Erodium cicutarium</i>	Unknown	2
<i>S. kali</i>	D <sup>2</sup>	<1

Table 6-1. Vegetation Communities Associated with the 100-N Area.  
(sheet 2 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENTAGE COVER
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>P. sandbergii</i>		
<i>B. tectorum</i>	S <sup>1</sup>	54
<i>P. sandbergii</i>	S <sup>3</sup>	16
<i>D. verna</i>	S	8
<i>H. umbellatum</i>	S	8
<i>S. altissimum</i>	Unknown	5
<i>Plantago patagonica</i>	Unknown	3
<i>S. kali</i>	D <sup>2</sup>	2
<i>Amsinckia</i> spp.	Unknown	<1
<i>Tragopogon dubius</i>	Unknown	<1
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>H. umbellatum</i>		
<i>B. tectorum</i>	S <sup>1</sup>	49
<i>H. umbellatum</i>	S	10
<i>Centaurea</i> spp.	Unknown	7
<i>D. verna</i>	S	3
<i>Amsinckia</i> spp.	Unknown	2
<i>S. altissimum</i>	Unknown	1
<i>E. cicutarium</i>	Unknown	<1
<i>Achillea millefolium</i>	Unknown	<1
<i>S. kali</i>	D <sup>2</sup>	<1

\* - percent of shrub cover was derived from data collected in 10- by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 m transect

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

## 7.0 100-D AREA

The 100-D Area is located approximately 2.4 km (1.5 mi) east-northeast of the 100-D Area and covers approximately 2.6 km<sup>2</sup> (1.0 km<sup>2</sup>). It is situated on an essentially flat, semi-arid bench immediately southeast of the Columbia River. The elevation of the land surface near the center of the area is approximately 142 m (466 ft) amsl, with land surface sloping to the northeast (about a 1% gradient) to an elevation of approximately 134 m (440 ft). A steep embankment of about 18 m (60 ft) is present at the river's edge along the northwestern margin of the unit (Fitzner et al. 1992). Soils in this area include Ephrata Stony Loam, Burbank Loamy Sand, Rupert Sand, and Ephrata Sandy Loam (Hajek 1966).

### 7.1 VEGETATION COMMUNITIES

Vegetation communities in this area are *B. tectorum*/*S. kali*, *C. nauseosus*/*B. tectorum*, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas, there was minimal (<10%) cover provided by plants because these areas are routinely sprayed with herbicide as needed as part of a vegetation control program. Percent of cover calculated from information from Daubenmire plots for the vegetation communities is listed in Table 7-1, and a map of the general vegetation communities is provided in Figure 7-1.

### 7.2 SHRUB COVER

Shrub cover is mainly provided by *C. nauseosus*. In the *C. nauseosus*/*B. tectorum* vegetation community, *C. nauseosus* provides approximately 21% cover and has a mean height of 49 cm. In the *B. tectorum*/*S. kali* vegetation community, available shrub cover is minimal (approximately 1 shrub per 100 m); therefore, no shrubs were recorded in the transect although *C. nauseosus* was present in the general area.

Figure 7-1. Vegetation Community Map for 100-D Area.

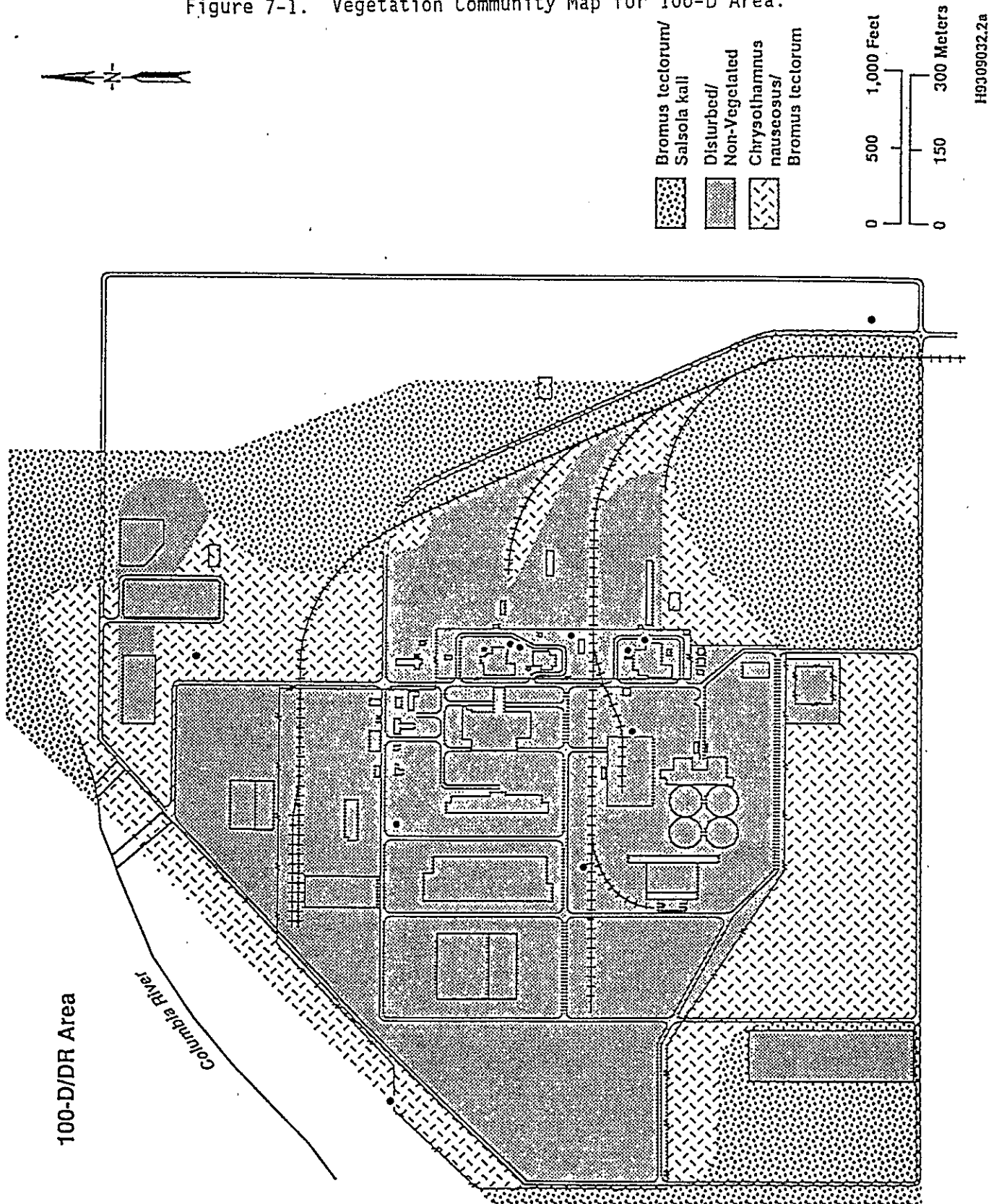


Table 7-1. Vegetation Communities Associated with the 100-D Area.

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>S. kali</i>		
<i>B. tectorum</i>	S <sup>1</sup>	32
<i>S. kali</i>	D <sup>2</sup>	10
<i>H. umbellatum</i>	S	8
<i>S. altissimum</i>	Unknown	7
<i>Amaranthus albus</i>	D <sup>3</sup>	1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>Sphaeralcea munroana</i>	D <sup>3</sup>	<1
<i>D. verna</i>	S	<1
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>B. tectorum</i>		
<i>C. nauseosus</i>	D <sup>2</sup>	21 *
<i>B. tectorum</i>	S <sup>1</sup>	9
<i>S. kali</i>	D <sup>2</sup>	7
<i>D. verna</i>	S	2
<i>H. umbellatum</i>	S	<1
<i>P. sandbergii</i>	S <sup>3</sup>	<1
<i>S. altissimum</i>	Unknown	<1
<i>Amsinckia spp.</i>	Unknown	<1
<i>S. munroana</i>	D <sup>3</sup>	<1

\* - percent of shrub cover was derived from data collected in 10 x 10 m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 m transect

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

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## 8.0 100-H AREA

The 100-H Area covers 5.86 km<sup>2</sup> (2.26 mi<sup>2</sup>) and is on a semi-arid bench, with elevation ranging from 116 to 140 m (380 to 460 ft) amsl (Fitzner et al. 1992). At least two different types of soil, Burbank Loamy Sand in and around the area and river-wash along the shoreline, have been identified in this area (Hajek 1966).

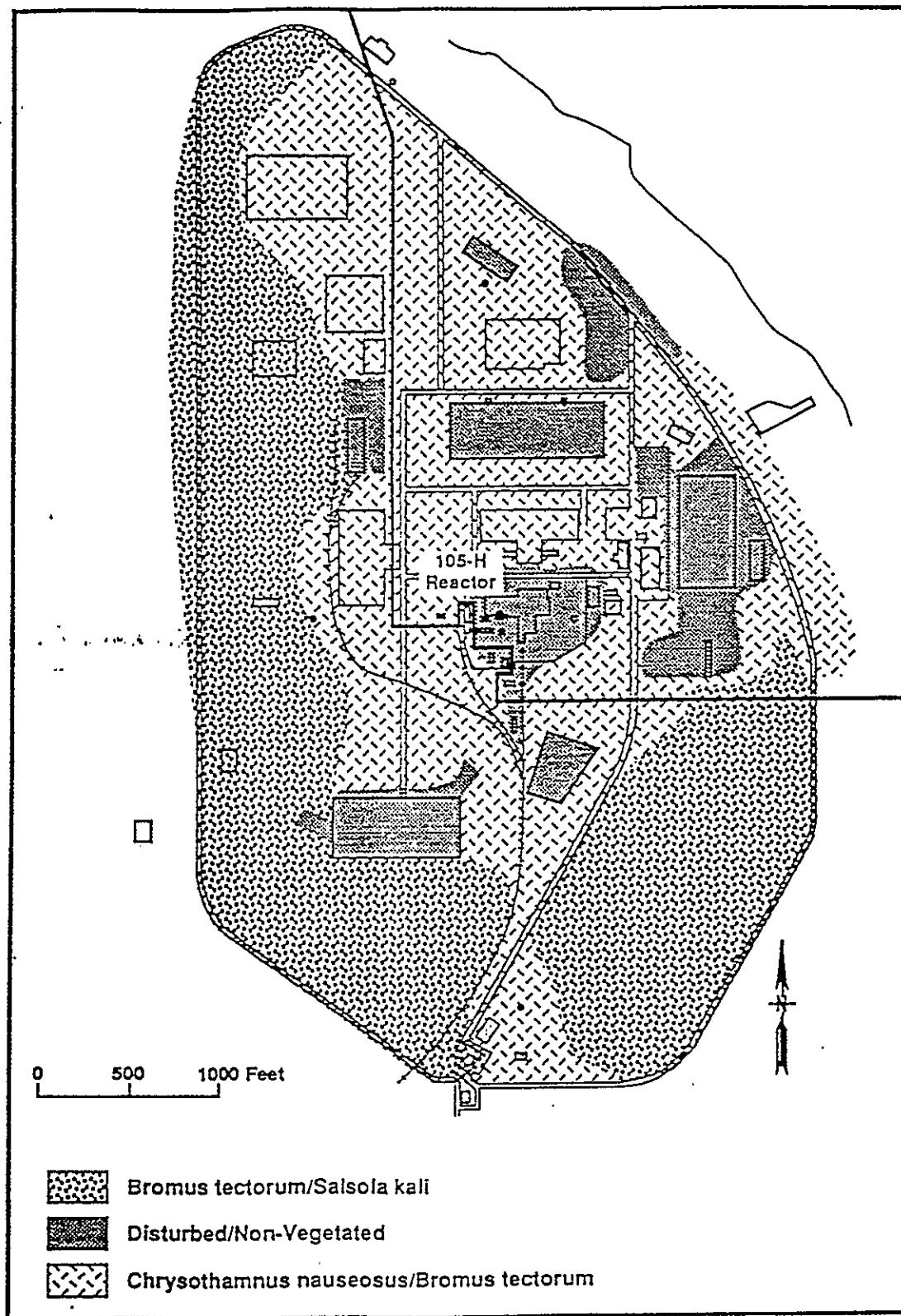
### 8.1 VEGETATION COMMUNITIES

Vegetation communities in this area are *B. tectorum*/*S. kali*, *C. nauseosus*/*P. sandbergii*, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas, there was minimal (less than 10%) cover provided by plants because these areas are routinely sprayed with herbicide as needed as part of a vegetation control program. Percent of cover calculated from information from Daubenmire plots for the vegetation communities is listed in Table 8-1. A map of the general vegetation communities is provided in Figure 8-1.

### 8.2 SHRUB COVER

Shrub cover is mainly provided by *C. nauseosus*. In the *C. nauseosus*/*P. sandbergii* vegetation community, the average shrub cover is 19% with a mean height of 59 cm. In the *B. tectorum*/*S. kali* vegetation community, the average shrub cover provided by *C. nauseosus* was 1%. No height data was collected for this vegetation community.

Figure 8-1. Vegetation Community Map for 100-H Area.



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Table 8-1. Vegetation Communities Associated with 100-H Area.

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>P. sandbergii</i>		
<i>P. sandbergii</i>	S <sup>3</sup>	29
<i>C. nauseosus</i>	D <sup>2</sup>	19 *
<i>S. kali</i>	D <sup>2</sup>	6
<i>B. tectorum</i>	S <sup>1</sup>	2
<i>S. cryptandrus</i>	S <sup>3</sup>	<1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>Centaurea spp.</i>	Unknown	<1
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>S. kali</i>		
<i>B. tectorum</i>	S <sup>1</sup>	13
<i>S. kali</i>	D <sup>2</sup>	9
<i>S. altissimum</i>	Unknown	4
<i>D. verna</i>	S	3
<i>C. nauseosus</i>	D <sup>2</sup>	1 *
<i>H. umbellatum</i>	S	1
<i>P. sandbergii</i>	S <sup>3</sup>	<1
<i>Amaranthus albus</i>	D <sup>3</sup>	<1
<i>Capsella bursa-pastoris</i>	Unknown	<1
<i>Lactuca serriola</i>	S <sup>2</sup>	<1
<i>S. cryptandrus</i>	S <sup>3</sup>	<1

\* - percent of shrub cover was derived from data collected in 10- by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 meter transect

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

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## 9.0 100-F AREA

The 100-F Area covers approximately 7.4 km<sup>2</sup> (2.9 mi<sup>2</sup>) and lies in a broad, essentially flat, semiarid plain on the eastern portion of a bend in the Columbia River. Elevation is approximately 122 m (400 ft) across the entire area. The river bank, which forms the northeast boundary of the area, drops steeply, approximately 9 m (30 ft) (Fitzner et al. 1992). The soils in this area have been identified as Pasco Silty Loam, Burbank Loamy Sand, and Ephrata Sandy Loam (Hajek 1966).

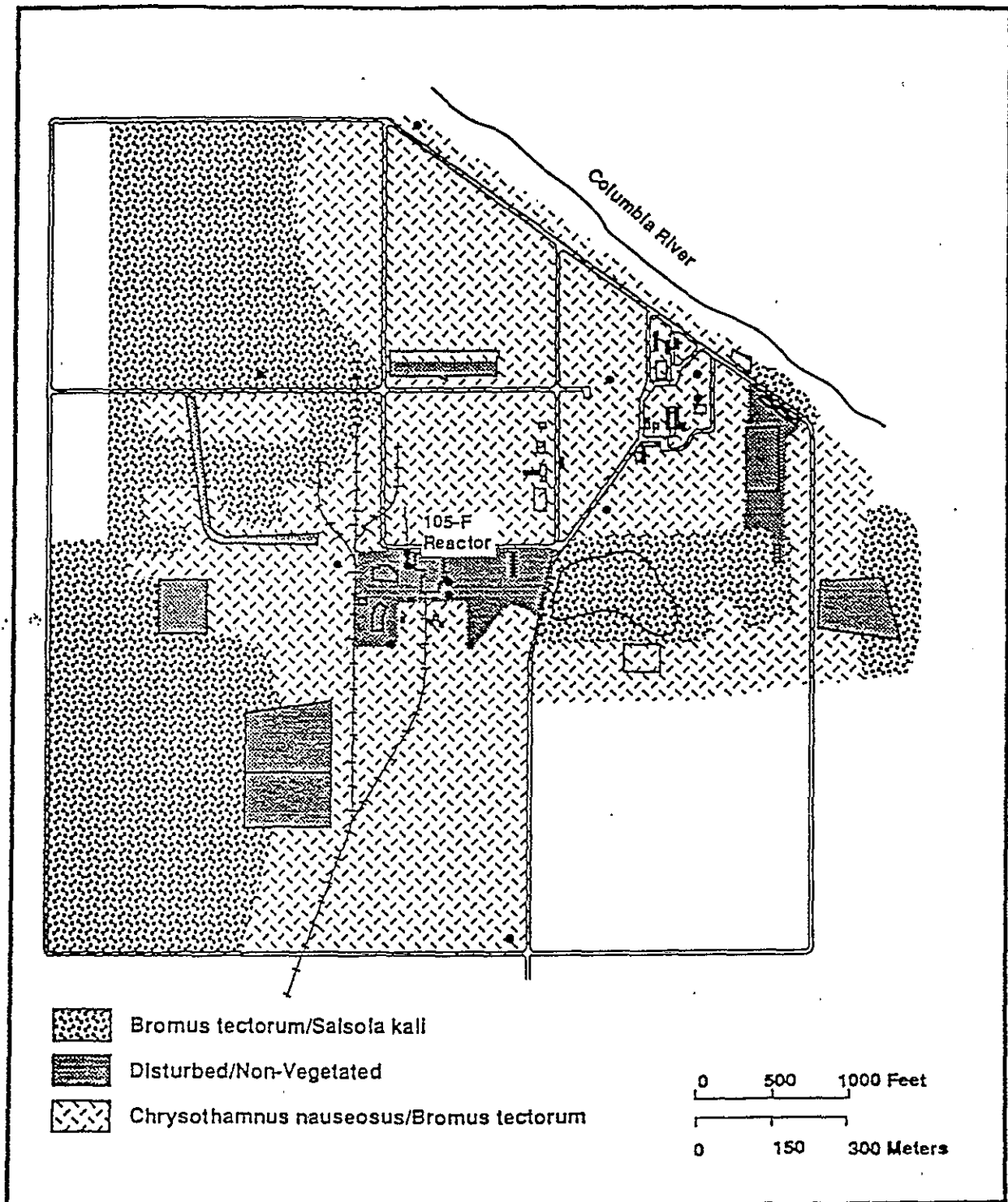
### 9.1 VEGETATION COMMUNITIES

Vegetation communities in this area are *C. nauseosus*/*B. tectorum*, *B. tectorum*/*S. kali*, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas, there was minimal (<5%) cover provided by plants because these areas are routinely sprayed with herbicide as needed as part of a vegetation control program. Percent of cover calculated from information from the Daubenmire plots for the vegetation communities is listed in Table 9-1, and a map of vegetation communities is provided in Figure 9-1.

### 9.2 SHRUB COVER

Shrub cover is mainly provided by *C. nauseosus*. In the *C. nauseosus*/*B. tectorum* vegetation community, the estimated shrub cover is 12% with a mean height of 54 cm. In the *B. tectorum*/*S. kali* vegetation community, available shrub cover is minimal (approximately 1 plant per 100 m); therefore, no shrubs were recorded in the transect although *C. nauseosus* was present in the general area.

Figure 9-1. Vegetation Community Map for 100-F Area.



GENM092493-J

Table 9-1. Vegetation Communities Associated with 100-F Area.

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITIES - <i>C. nauseosus</i> / <i>B. tectorum</i>		
<i>C. nauseosus</i>	D <sup>2</sup>	12 *
<i>B. tectorum</i>	S <sup>1</sup>	10
<i>A. acanthicarpa</i>	D <sup>2</sup>	1
<i>Oenothera pallida</i>	D <sup>3</sup>	<1
<i>S. cryptandrus</i>	S <sup>3</sup>	<1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>S. kali</i>	D <sup>2</sup>	<1
<i>Trifolium repens</i>	Unknown	<1
<i>S. altissimum</i>	Unknown	<1
<i>P. sandbergii</i>	S <sup>3</sup>	<1
<i>D. verna</i>	S	<1
<i>Lepidium latifolium</i>	Unknown	<1
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>S. kali</i>		
<i>B. tectorum</i>	S <sup>1</sup>	14
<i>S. kali</i>	D <sup>2</sup>	9
<i>S. altissimum</i>	Unknown	2
<i>P. sandbergii</i>	S <sup>3</sup>	<1
<i>O. pallida</i>	D <sup>3</sup>	<1
<i>Amsinckia spp.</i>	Unknown	<1

\* - percent of shrub cover was derived from data collected in 10- by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 m transect.

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep.

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

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## 10.0 200-WEST AREA

The 200-West Area covers approximately 23 km<sup>2</sup> (8.9 mi<sup>2</sup>) and lies on a terrace known as the 200 Area Plateau. The elevation ranges from 190 to 245 m (623 to 803 ft) amsl. (Fitzner et al. 1992). Soils in the area have been identified as Rupert Sand and Burbank Loamy Sand (Hajek 1966).

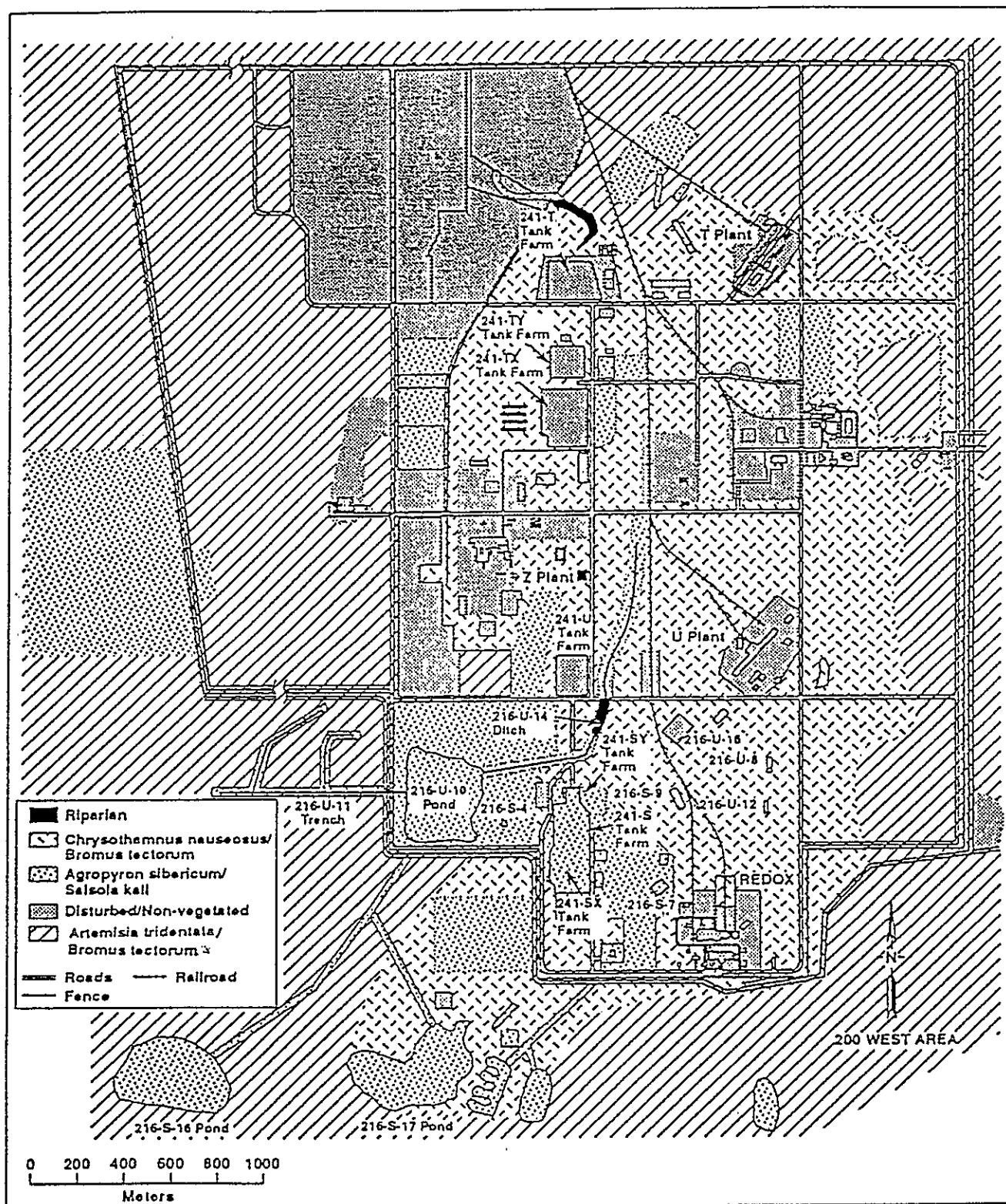
## 10.1 VEGETATION COMMUNITIES

Vegetation communities in this area are *C. nauseosus*/*B. tectorum*, *Artemisia tridentata*/*B. tectorum*, *Agropyron sibericum*/*S. kali*, riparian, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas, the percent of cover provided by plants is minimal (<10%) because these areas are sprayed with herbicide as needed as part of the vegetation control program. Percent of cover calculated from information from Daubenmire plots for the vegetation communities is listed in Table 10-1, and a map of the general vegetation communities is provided in Figure 10-1. The riparian community was not surveyed with transects so there is no information on percent of cover.

## 10.2 SHRUB COVER

Shrub cover is mainly provided by *A. tridentata* and *C. nauseosus*, with small amounts of *Grayia spinosa*, *Purshia tridentata*, *Lycium halimifolium*, and *Chrysothamnus viscidiflorus* also present. In the *C. nauseosus*/*B. tectorum* vegetation community, *C. nauseosus* provides approximately 7% cover with a mean height of 44 cm. In this vegetation community there is considerable variability in the cover distribution with some areas being heavily vegetated with *C. nauseosus* and some areas having only sparse shrub cover. Most of the waste sites in this vegetation community either have very little vegetation or are vegetated with *S. altissimum*, *S. kali*, and *B. tectorum*. In the *A. tridentata*/*B. tectorum* vegetation community, the average shrub cover is approximately 0.5% *Chrysothamnus viscidiflorus*, 1% *Grayia spinosa*, and 14% *Artemisia tridentata*. The average shrub height is 44 cm for *C. viscidiflorus*, 75 cm for *G. spinosa*, and 84 cm for *A. tridentata*. In the *A. sibericum*/*S. kali* vegetation community, shrub cover is virtually absent (approximately 1 plant per 300 m).

Figure 10-1. Vegetation Community Map for 200 West Area.



H9308015.1a



Table 10-1. Vegetation Communities Associated with 200 West Area.  
(sheet 1 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>C. nauseosus</i> / <i>B. tectorum</i>		
<i>B. tectorum</i>	S <sup>1</sup>	28
<i>C. nauseosus</i>	D <sup>2</sup>	7 *
<i>S. kali</i>	D <sup>2</sup>	4
<i>H. umbellatum</i>	S	3
<i>P. sandbergii</i>	S <sup>3</sup>	2
<i>S. altissimum</i>	Unknown	2
<i>Oryzopsis hymenoides</i>	S <sup>2</sup>	2
<i>Centaurea spp.</i>	Unknown	1
<i>D. verna</i>	S	<1
<i>Festuca octoflora</i>	S <sup>3</sup>	<1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>L. serriola</i>	S <sup>2</sup>	<1
VEGETATION COMMUNITY - <i>A. sibericum</i> / <i>S. kali</i>		
<i>A. sibericum</i>	Unknown	11
<i>S. kali</i>	D <sup>2</sup>	1
<i>B. tectorum</i>	S	<1
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>S. altissimum</i>		
<i>B. tectorum</i>	S <sup>1</sup>	40
<i>S. altissimum</i>	Unknown	7
<i>S. kali</i>	D <sup>2</sup>	3
<i>P. sandbergii</i>	S <sup>3</sup>	2
<i>H. umbellatum</i>	S	2
<i>D. verna</i>	S	<1
<i>Microsteris gracilis</i>	Unknown	<1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>Tragopogon dubius</i>	Unknown	<1

Table 10-1. Vegetation Communities Associated with 200-West Area.  
(sheet 2 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>A. tridentata</i> / <i>B. tectorum</i>		
<i>B. tectorum</i>	S <sup>1</sup>	34
<i>A. tridentata</i>	D <sup>2</sup>	14 *
<i>P. sandbergii</i>	S <sup>3</sup>	7
<i>D. verna</i>	S	2
<i>S. altissimum</i>	Unknown	1
<i>S. kali</i>	D <sup>2</sup>	1
<i>G. spinosa</i>	D <sup>2</sup>	1 *
<i>H. umbellatum</i>	S	<1
<i>Balsamorhiza careyana</i>	S <sup>2</sup>	<1
<i>C. viscidiflorus</i>	D <sup>2</sup>	<1 *
<i>Amsinckia</i> spp.	Unknown	<1
<i>Cymopterus terebinthinus</i>	S <sup>2</sup>	<1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>Astragalus</i> species	Unknown	<1
<i>Phlox longifolia</i>	Unknown	<1
<i>Microsteris gracilis</i>	Unknown	<1
<i>Sitanion hystrix</i>	Unknown	<1

\* - percent of shrub cover was derived from data collected in 10-by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 m transect

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

<sup>4</sup>Tierney and Foxx 1987

## 11.0 200-EAST AREA

### 11.1 VEGETATION COMMUNITIES

The 200 East Area and the area immediately outside the fence line are composed of the vegetation communities: *B. tectorum*/*S. kali*, *A. tridentata*/*B. tectorum*, *A. sibericum*/*P. sandbergii*, riparian, and disturbed/nonvegetated areas. In the disturbed/nonvegetated areas there was minimal (<10%) cover provided by plants because these areas are sprayed with herbicide as needed as part of the vegetation control program. Percent of cover calculated from information from Daubenmire plots for the vegetation communities is listed in Table 11-1, and a map of the general vegetation communities is given in Figure 11-1. The riparian community was not surveyed with transects so there is no information on percent of cover.

### 11.2 SHRUB COVER

Shrub cover is mainly provided by *A. tridentata* and *C. nauseosus* with small amounts of *G. spinosa*, *P. tridentata*, *L. halimifolium*, and *C. viscidiflorus* also present. In the *A. tridentata*/*B. tectorum* vegetation community, approximate shrub cover is 26% *A. tridentata* with a mean height of 118 cm. The *B. tectorum*/*S. kali* vegetation community does contain some *C. nauseosus*, but the shrubs are very sparse (1 per 100 m) and were not recorded in transect data. In the *A. sibericum*/*P. sandbergii* vegetation community, shrub cover is virtually absent.

Figure 11-1. Vegetation Community Map for 200 East Area.

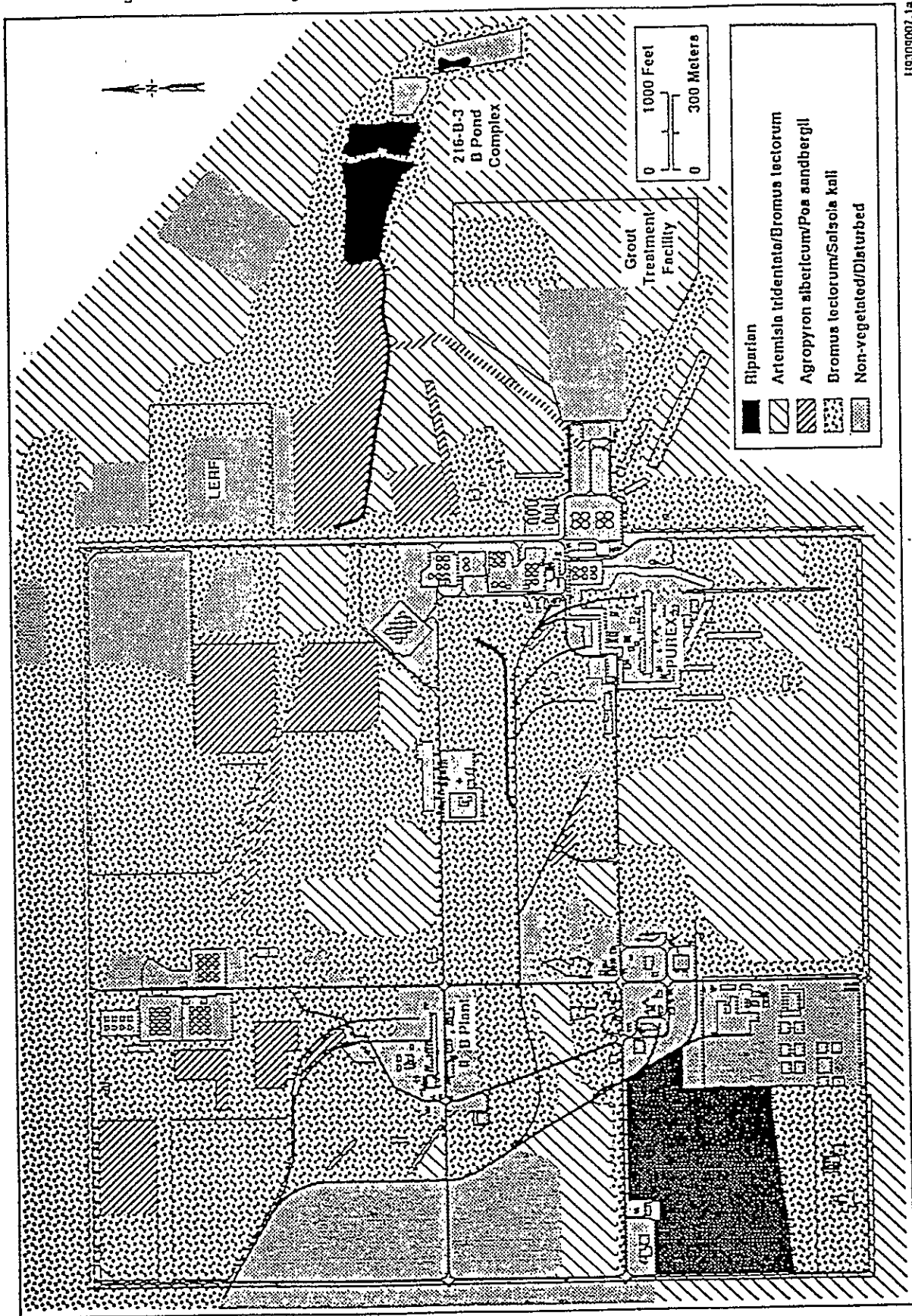


Table 11-1. Vegetation Communities Associated with the 200 East Area.  
(sheet 1 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>B. tectorum</i> / <i>S. kali</i>		
<i>B. tectorum</i>	S <sup>1</sup>	19
<i>S. kali</i>	D <sup>2</sup>	8
<i>Stipa comata</i>	S <sup>2</sup>	2
<i>P. sandbergii</i>	S <sup>3</sup>	2
<i>O. hymenoides</i>	S <sup>2</sup>	2
<i>S. altissimum</i>	Unknown	1
<i>Amsinckia spp.</i>	Unknown	<1
<i>M. canescens</i>	S <sup>2</sup>	<1
<i>H. umbellatum</i>	S	<1
VEGETATION COMMUNITY - <i>A. tridentata</i> / <i>B. tectorum</i>		
<i>A. tridentata</i>	D <sup>2</sup>	26 *
<i>B. tectorum</i>	S <sup>1</sup>	14
<i>F. octoflora</i>	S <sup>3</sup>	5
<i>S. altissimum</i>	Unknown	1
<i>L. serriola</i>	S <sup>2</sup>	<1
<i>P. sandbergii</i>	S <sup>3</sup>	<1
<i>S. kali</i>	D <sup>2</sup>	<1
<i>P. longifolia</i>	Unknown	<1
<i>T. dubius</i>	Unknown	<1

Table 11.1. Vegetation Communities Associated with 200 East Area.  
(sheet 2 of 2)

SPECIES	ROOT DEPTH <sup>a</sup>	PERCENT COVER
VEGETATION COMMUNITY - <i>A. sibericum</i> / <i>P. sandbergii</i>		
<i>A. sibericum</i>	Unknown	8
<i>P. sandbergii</i>	S <sup>3</sup>	3
<i>B. tectorum</i>	S <sup>1</sup>	1
<i>S. kali</i>	D <sup>2</sup>	<1
<i>D. verna</i>	S	<1

\* - percent of shrub cover was derived from data collected in 10- by 10-m plots at 25-35 m, 50-60 m, and 75-85 m along the 100 m transect

<sup>a</sup>D - plants with root systems known to exceed 150 cm deep

S - plants with root systems not known to exceed 150 cm deep

<sup>1</sup>Foxx et al. 1984a

<sup>2</sup>Klepper et al. 1985

<sup>3</sup>Foxx et al. 1984b

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APPENDIX A

TRANSECT LOCATIONS

TRANSECT LOCATIONS

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## Transect Locations - 100 and 200 Areas. (sheet 1 of 2)

AREA	VEGETATION COMMUNITY	TRANSECT NUMBER	LOCATION UTM'S* NAD** 1927
100-K	ChNa/BrTe	1	300630 E; 5168720 N
100-K	BrTe/PoSs	2	302100 E; 5169510 N
100-K	ChNa/PoSs/ BrTe	3	301690 E; 5168720 N
100-N	ChNa/BrTe	4	303800 E; 5172420 N
100-N	BrTe/PoSs	5	304390 E; 5172015 N
100-N	BrTe/CeSp.	6	303270 E; 5171730 N
100-N	ChNa/BrTe	11	303200 E; 5171500 N
100-N	BrTe/HoUm	12	303080 E; 5171590 N
100-F	ChNa/BrTe	27	313100 E; 5170290 N
100-F	ChNa/BrTe	30	312580 E; 5170450 N
100-F	BrTe/SaKa	31	313400 E; 5169530 N
100-H	BrTe/SaKa	32	310580 E; 5174650 N
100-H	ChNa/BrTe	28	313060 E; 5170330 N
100-H	ChNa/BrTe	33	310930 E; 5175020 N
100-D	BrTe/SaKa	34	306810 E; 5173970 N
100-D	ChNa/BrTe	35	305540 E; 5173360 N
100-D	ChNa/BrTe	36	306100 E; 5174680 N
100-BC	BrTe/SaKa	37	296800 E; 5167210 N
100-BC	ChNa/BrTe	38	297800 E; 5166280 N
200-W	ArTr/BrTe	7	302450 E; 5158250 N
200-W	ArTr/BrTe	8	303800 E; 5160620 N
200-W	ArTr/BrTe	9	303805 E; 5160760 N
200-W	ArTr/BrTe	10	304430 E; 5160670 N
200-W	ArTr/BrTe	13	299910 E; 5160030 N
200-W	AgSi/SaKa	14	298300 E; 5156700 N
200-W	ChNa/BrTe	15	299320 E; 5156720

## Transect Locations - 100 and 200 Areas.. (sheet 2 of 2)

AREA	VEGETATION COMMUNITY	TRANSECT NUMBER	LOCATION UTM'S* NAD** 1927
200-W	ChNa?BrTe	16	299540 E; 5157520 N
200-W	AgSi/SaKa	18	296500 E; 5155800 N
200-W	BrTe/SiAl	21	299930 E; 5159330 N
200-W	BrTe/SiAl	22	295305 E; 5156895 N
200-E	BrTe/SaKa	17	295480 E; 5155040 N
200-E	ArTr/BrTe	19	306300 E; 5157460 N
200-E	AgSi/PoSa	20	304650 E; 5160030 N
200-E	BrTe/SaKa	23	305200 E; 5159090 N
200-E	ArTr/BrTe	24	304500 E; 5158760 N
200-E	BrTe/SaKa	25	304700 E; 5160040 N
200-E	BrTe/SaKa	26	305900 E; 5159990 N
200-E	BrTe/SaKa	29	307140 E; 5157290 N

ChNa/BrTe - Chrysothamnus nauseosus/Bromus tectorum

BrTe/SaKa - Bromus tectorum/Salsola Kali

AgSi/SaKa - Agropyron sibericum/Salsola Kali

ArTr/BrTe - Artemisia tridentata/Bromus tectorum

BrTe/HoUm - Bromus tectorum/Holosteum umbellatum

BrTe/CeSp. - Bromus tectorum/Centaurea species

AgSi/PoSa - Agropyron sibericum/Poa sandbergii

\*Universal Transverse Mercator

\*\*North American Datum

APPENDIX B

PLANT SPECIES RECORDED DURING GROUND-TRUTHING ACTIVITIES

PLANT SPECIES RECORDED DURING GROUND-TRUTHING ACTIVITIES

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## Plant Species Recorded During Ground Truthing - 100-K Area

## Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Calochortus macrocarpus*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Eriogonum sphaerocephalum*  
*Centaurea* spp.  
*Grindelia columbiana*  
*Ambrosia acanthicarpa*  
*Erigeron poliospermus*  
*Erigeron pumilus*  
*Lepidium perfoliatum*  
*Lomatium grayi*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Balsamorhiza careyana*  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Sphaeralcea munroana*  
*Amsinckia* spp.

## Shrubs

*Chrysothamnus nauseosus*  
*Chrysothamnus viscidiflorus*  
*Artemisia tridentata*

## Grasses

*Poa sandbergii*  
*Stipa comata*  
*Agropyron spicatum*  
*Bromus tectorum*  
*Oryzopsis hymenoides*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*

## Plant Species Recorded During Ground Truthing - 100-H Area

## Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Eriogonum niveum*  
*Centaurea* spp.  
*Ambrosia acanthicarpa*  
*Erigeron* spp.  
*Lepidium perfoliatum*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Balsamorhiza careyana*  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Sphaeralcea munroana*  
*Capsella bursa-pastoris*  
*Heterotheca villosa*  
*Conyza canadensis*  
*Descurainia pinnata*  
*Melilotus alba*  
*Verbascum thapsus*  
*Amaranthus albus*

## Shrubs

*Chrysothamnus nauseosus*  
*Chrysothamnus viscidiflorus*  
*Artemisia tridentata*  
*Grayia spinosa*

## Grasses

*Poa sandbergii*  
*Stipa comata*  
*Bromus tectorum*  
*Oryzopsis hymenoides*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*

Plant Species Recorded during Ground Truthing - 100-N Area

Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Ambrosia acanthicarpa*  
*Erigeron filifolius*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Balsamorhiza careyana*  
*Amsinckia* spp.  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Sphaeralcea munroana*  
*Phlox longifolia*  
*Descurainia pinnata*  
*Verbascum thapsus*  
*Cirsium vulgare*  
*Cymopterus terebinthinus*  
*Plantago patagonica*  
*Calochortus macrocarpus*  
*Penstemon acuminatus*  
*Lomatium grayi*  
*Equisetum* spp.  
*Lepidium perfoliatum*

Shrubs

*Chrysothamnus nauseosus*  
*Artemisia tridentata*  
*Artemisia dracunculus*  
*Grayia spinosa*  
*Rosa woodsii*

Grasses

*Poa sandbergii*  
*Stipa comata*  
*Agropyron spicatum*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*  
*Oryzopsis hymenoides*  
*Bromus tectorum*  
*Agropyron dasytachyum*

Plant Species Recorded During Ground Truthing - 100-F Area

Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Conyza canadensis*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Eriogonum niveum*  
*Oenothera pallida*  
*Chaenactis douglasii*  
*Melilotus alba*  
*Verbascum thapsus*  
*Centaurea spp.*  
*Grindelia columbiana*  
*Ambrosia acanthicarpa*  
*Lepidium perfoliatum*  
*Lomatium grayi*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Balsamorhiza careyana*  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Erigeron spp.*  
*Sphaeralcea munroana*  
*Amsinckia spp.*

Shrubs

*Chrysothamnus nauseosus*  
*Chrysothamnus viscidiflorus*  
*Artemisia tridentata*

Grasses

*Poa sandbergii*  
*Stipa comata*  
*Agropyron spicatum*  
*Bromus tectorum*  
*Oryzopsis hymenoides*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*

## Plant Species Recorded During Ground Truthing - 100-D Area

## Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Conyza canadensis*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Eriogonum niveum*  
*Oenothera pallida*  
*Chaenactis douglasii*  
*Melilotus alba*  
*Verbascum thapsus*  
*Centaurea spp.*  
*Grindelia columbiana*  
*Ambrosia acanthicarpa*  
*Lepidium perfoliatum*  
*Lomatium grayi*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Balsamorhiza careyana*  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Erigeron spp.*  
*Sphaeralcea munroana*  
*Heterotheca villosa*  
*Amsinckia spp.*

## Grasses

*Poa sandbergii*  
*Stipa comata*  
*Agropyron spicatum*  
*Bromus tectorum*  
*Oryzopsis hymenoides*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*

## Shrubs

*Chrysothamnus nauseosus*  
*Chrysothamnus viscidiflorus*  
*Artemisia tridentata*

Plant Species Recorded During Ground Truthing - 100-BC Area

Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Eriogonum niveum*  
*Oenothera pallida*  
*Chaenactis douglasii*  
*Melilotus alba*  
*Verbascum thapsus*  
*Centaurea spp.*  
*Ambrosia acanthicarpa*  
*Lepidium perfoliatum*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Balsamorhiza careyana*  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Erigeron spp.*  
*Sphaeralcea munroana*  
*Amsinckia species*

Grasses

*Poa sandbergii*  
*Stipa comata*  
*Bromus tectorum*  
*Oryzopsis hymenoides*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*

Shrubs

*Chrysothamnus nauseosus*  
*Artemisia tridentata*

## Plant Species Recorded During Ground Truthing - 200-West Area

## Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Ambrosia acanthicarpa*  
*Erigeron poliospermus*  
*Erigeron filifolius*  
*Cryptantha leucophaea*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Sitanion hystrix*  
*Balsamorhiza careyana*  
*Amsinckia* spp.  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Sphaeralcea munroana*  
*Phlox longifolia*  
*Descurainia pinnata*  
*Verbascum thapsus*  
*Cirsium vulgare*  
*Cymopterus terebinthinus*  
*Plantago patagonica*  
*Calochortus macrocarpus*  
*Penstemon acuminatus*  
*Lomatium grayi*  
*Equisetum* spp.  
*Lepidium perfoliatum*  
*Astragalus* spp.  
*Crepis atrabarba*  
*Lupinus pusillus*  
*Orobanche fasciculata*  
*Comandra umbellatum*  
*Townsendia florifer*  
*Chaenactis douglasii*  
*Trifolium repens*  
*Microsteris gracilis*  
*Melilotus alba*  
*Oenothera pallida*

## Shrubs

*Chrysothamnus viscidiflorus*  
*Chrysothamnus nauseosus*  
*Artemisia tridentata*  
*Grayia spinosa*  
*Lycium halimifolium*  
*Purshia tridentata*

## Grasses

*Poa sandbergii*  
*Stipa comata*  
*Agropyron spicatum*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*  
*Oryzopsis hymenoides*  
*Bromus tectorum*  
*Festuca octoflora*  
*Agropyron dasytachyum*  
*Agropyron sibericum*  
*Elymus* sp.

## Plant Species Recorded During Ground Truthing - 200-East Area

## Forbs

*Draba verna*  
*Holosteum umbellatum*  
*Salsola kali*  
*Erodium cicutarium*  
*Tragopogon dubius*  
*Plantago patagonica*  
*Ambrosia acanthicarpa*  
*Erigeron poliospermus*  
*Erigeron filifolius*  
*Cryptantha leucophaea*  
*Lactuca serriola*  
*Machaeranthera canescens*  
*Sitanion hystrix*  
*alsamorhiza careyana*  
*Amsinckia spp.*  
*Sisymbrium altissimum*  
*Achillea millefolium*  
*Sphaeralcea munroana*  
*Phlox longifolia*  
*Descurainia pinnata*  
*Verbascum thapsus*  
*Cirsium Vulgare*  
*Cymopterus terebinthinus*  
*Plantago patagonica*  
*Calochortus macrocarpus*  
*Penstemon acuminatus*  
*Lomatium grayi*  
*Rosa woodsii*  
*Equisetum spp.*  
*Lepidium perfoliatum*  
*Astragalus spp.*  
*Crepis atrabarba*  
*Lupinus pusillus*  
*Orobancha fasciculata*  
*Comandra umbellatum*  
*Townsendia florifer*  
*Chaenactis douglasii*  
*Trifolium repens*  
*Microsteris gracilis*  
*Melilotus alba*  
*Oenothera pallida*  
*Conyza canadensis*

## Grasses

*Poa sandbergii*  
*Stipa comata*  
*Agropyron spicatum*  
*Sporobolus cryptandrus*  
*Sitanion hystrix*  
*Oryzopsis hymenoides*  
*Bromus tectorum*  
*Festuca octoflora*  
*Agropyron dasytachyum*  
*Agropyron sibericum*  
*Elymus sp.*

## Shrubs

*Chrysothamnus viscidiflorus*  
*Chrysothamnus nauseosus*  
*Artemisia tridentata*  
*Grayia spinosa*  
*Lycium halimifolium*